

#### **CHAPTER - II**

# THE ORIGN AND GROWTH OF NEYVELI LIGNITE CORPORATION

The industrial revolution spanning the 19<sup>th</sup> and 20<sup>th</sup> centuries have been transforming large parts of the world from agrarian to a modern Industrial society. Many small industries of the past have rapidly grown into national and international industries of great size, variety and complexity equipped to meet the growing needs of the world population. The rapid strides of science and technology coupled with research and development initiatives have brought into being many new developments.

Developmental activities means consumption of energy and that is the reason why energy consumption of a country is taken as the barometer of its growth. As we talk about these multi- dimensional roles the energy plays, it is imperative to see how NLC, the 'energy town' 1 now in its rosy post–silver jubilee phase, has trodden earlier virtually thorny paths.

The Neyveli Lignite Corporation now occupies a proud status in the industrial coal map of India. It is one of the major industrial complexes in our country. Besides earning accolades for itself, it has brought fame to Tamil Nadu and to India.<sup>2</sup> The Neyveli Lignite Corporation has demonstrated to the world the inexhaustible potential of a public sector undertaking in boosting the economy of a country.

Neyveli is in the South Arcot district of Tamil Nadu. It is 200 kilometres south east to Madras. In the past it was a dry place with Jack trees and cashew groves and was infested with snakes, scorpions and wild animals inhabited in that place. Nobody dreamt that a vast treasure of lignite was lying hidden in the bowels of the land. Before the birth of the Lignite Corporation, Neyveli was an unknown place. It was just a small hamlet with about fifty to hundred houses.<sup>3</sup>

The Neyveli Lignite Corporation which is a Government of India enterprise is engaged in the commercial mining of lignite. It is an integrated complex. At present it consists of two lignite mines, two thermal power stations, a fertilizer plant, a Briquetting and Carbonisation plant and a Clay Beneficiation Plant.

Coal is divided into five classes- anthracite, bituminous, sub bituminous, lignite and peat. Peat is the earliest stage in the formation of coal. Heat and pressure force the moisture and hydrocarbon from the peat until progressively higher ranks of coal are formed. Anthracite contains the lowest percentage of moisture and the highest percentage of carbon. The chemical and physical properties of the other types lie between anthracite and peat. Higher ranks of coal generally have agglomerating characteristics (i.e) the tendency to fuse when heated. The lowest rank coals, sub bituminous and lignite are non-agglomerating. <sup>4</sup>

Lignite is defined as the baby of the coal family. It is popularly known as "Brown Diamond", 'Brown Coal' and "Black Gold". These descriptions are indicative of the value attached to the lignite. It is a fossil fuel belonging to the Miocene age. Tan brown in colour, brittle to handle, light for the feel, lignite is born of vegetable matter having undergone bio-chemical decay to the stage of peat (rotten wood) and then metamorphosed to lignite under pressure of the soil above through floods, movement of earth's crust and dehydration.<sup>5</sup>



Lignite popularly known as Brown Diamond or Brown Coal or Black
Gold

When the pressure of lignite, particularly the horizontal thrust, is further increased, lignite is made denser and less volumetric and becomes coal. It might take millions of years for lignite to become coal In the Neyveli belt, There is a high-pressure water-strata underneath the lignite bed, necessitating the aquifer to be depressurized to facilitate lignite extraction. This phenomenon is attributed to deposition of the soil and movement of earth's crust over vegetable matter grown along water-logged areas. Such water bearing strata consist of un-compacted sand, and water filling the interstices between sand particles. The upward thrust of water is kept under check by the weight of lignite seams and by the heavy over burden.

The over burden to lignite ratio varies in the contiguous belt with a minimum of 2:1 maximum of 24:1 and an average of 88:1. The overburden contains workable layer of high alumina clay, Kaoline, good quartz sand, often water logged sandstone grits and clays of variegated colour. The neyveli lignite varies in colour from brown to dark brown and has non bonded granular structure. Microscopic studies of these sections prepared from bulk samples of lignite indicate that the fuel is composed of a wide variety of plant in gradient, mainly of coniferous nature.



Lignite bed at Neyveli

The lignite bed in Neyveli varies in thickness from 15 meters to 30 meters with moisture content of about 50 percent. In Australia and Germany the water content is as high as 66 percent, but much of the moisture can be removed by drying either naturally of artificially. It contains 65 to 70 percent of carbon 20 to 25 percent of oxygen about 5 of percent hydrogen and small amounts of nitrogen and sulphur. The average colorific value of lignite is 2400 Kcal and has the advantage of being free burning, of having low ash and of having rapid and complete combustion. As the volatile matter is usually about 50 percent, lignite burns readily. Air-dried lignite is quite suitable for direct burning fir high capacity boilers, as lignite can be burnt in the pulverized form.<sup>7</sup>

The poor coking properties of lignite make it unsuitable for high temperature carbonization, but low temperature carbonization of lignite is practicable because of the possibilities of wide application of the products. The tar (containing a high percentage of tar acids and sometimes Paraffin waxes) can be processed to yield synthetic petrol by hydrogenation or for chemicals by further treatment. The lignite tar obtained from low temperature carbonization can also be directly hydrogenated under pressure with catalyst, for the manufacture of aviation oil, motor spirit, as well as diesel oil. Lignite also contains a valuable wax known as molten wax which eventually finds extensive use in electrical industries for insulation, in fats and oils as hardeners, in lubricating greases, in vanish and paint industries, in making shoe polishes etc.

The lignite tar is very rich in tar acids which can be processed into valuable chemicals for plastic industry (eg.Phenol–Formal–Dehyde, Bakelite Resin, Flotation Reagents, Preservatives, Disinfectants, medical products etc). The lignite tar also contains approximately 7% of crude paraffin wax which can be processed to yield about 70% of pure paraffin wax. Lignite or lignite char can also be gasified for production of synthesis gas to extract ammonia, methyl alcohol and synthetic oil. Domestic gas can also be produced from lignite. The subject of lignite research therefore is an interesting and varied one on the fundamental and applied aspects as well.

Fifty percent of the World's coal reserves are lignite. The world's reserves of lignite is estimated to be around 1,43,900 million tonnes and of these 3 to 4 percent are deposited in India. In Australia and Germany lignite has been fully explored and utilized for industrial progress. The total lignite reserve of India is estimated around 6419 million tonnes and the reserves in Tamil Nadu around 5039 million tones. Hence nearly 78% of the total reserves of the country are available in Tamil Nadu. More than 65% of the total reserves in Tamil Nadu are comprised in Neyveli.

Lignite deposits are found in Tamil Nadu, Pondicherry, Gujarat, Rajasthan, Jammu and Kashmir and Kerala. Most of the lignite deposits exist as sub-surface deposits. Their occurrences are dissimilar in nature. The sub-surface nature of these occurrences has necessitated the adoption of an effective and convenient method of exploration. It is called the surface Geophysical survey and drilling.

The occurrences of lignite in Tamil Nadu are mainly confined to Neyveli in South Arcot district, Jayam konda cholapuram is in Tiruchirapalli district, Bahur field falling mostly in Pondicherry state and partly in South Arcot district. Besides the above well known places, lignite occurrences are also reported in certain areas of Thanjavur, Thiruchirapalli, and Ramanathapuram. These lignite deposits occur as sub-surface deposits which are a part of the tertiary formations.

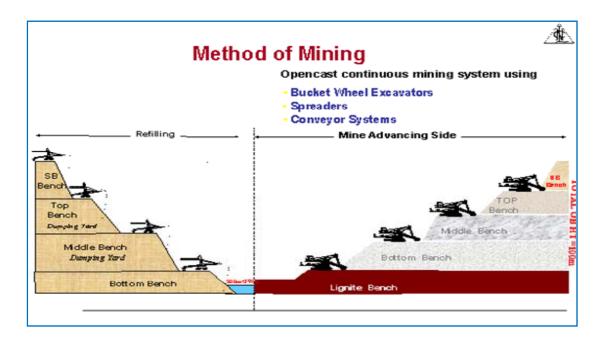
The Neyveli belt extends to about 30 kms from Neyveli towards Bay of Bengal. The lignite bed is between 18 and 80 feet in thickness and occurs only below 150 feet. Investigations have indicated the existence of about 3300 million tonnes (M.T.) of lignite under inferior category over an area of 480 sq. kms and out of this about 2000 million tonnes have been proved and 1300 million tonnes still remain to be proved.

The Neyveli Lignite field is associated with the Cuddalore ore formations belonging to Miocene age. The fossil fuel lies critically sand witched above a high pressure artesian aquifer and beneath a hard and clayey overburden. This necessitated the adoption of open cast mining technology because of weak roof conditions, spontaneous combustible nature of lignite and the high pressure

aquifer. Hence extraction of lignite posed a great challenge to the men in charge of the project. To extract one tone of lignite about 13 - 15 tonnes of water will have to be pumped out and about 10 to 12 tonnes of overburden will have to be removed.

## Method of Mining in Neyveli opencast mines

In NLC mines, Specialized Mining Equipments (SME) is used for mining both overburden and lignite. The SME includes equipments such as Bucket Wheel Excavators (BWE), Mobile Transfer Conveyors (MTC), Conveyor system, Tripper and Spreader etc.



It was as early as 1828, the Sub-Collector of Thanjavur, Mr.Nelson, reported to the then Government of Madras the occurrence of peat, a low calorific fuel of coal family near point Calimere. In 1934- Lignite exploration was taken up in the Neyveli area by the Industries Department in the Government of Madras. The workmen engaged in drilling work mistook the black particles for black clay. As a result the exploration work did not succeed in locating lignite there.<sup>13</sup>

The attempt at exploring further was shelved till, Shri Jambulinga Mudaliar a famous landlord, once more brought it out. He was a prominent political figure and president of the South Arcot District Board. It was he who noticed in 1935

some brown substance gushing forth with water from out of a deep bore well sunk in his farm. He was a farmer with a remarkable foresight. He wondered whether it could be coal. At that time a few geologists were camping at virudhachalam to conduct some experiments. Jambulinga Mudaliar invited them to his farm.

The geologists noted with great interest the black particles present in the gushing water from the well. They thought that it might be lignite. Jambulinga Mudaliar sent samples to Madras for analysis. Experiments carried on during 1937 –1938 confirmed that the specimen was lignite. Thus the credit for having discovered lignite in Neyveli is given to Jambulinga Mudaliar. The country is grateful to this distinguished farmer but for whose curiosity and sustained interest thee brown treasure in Neyveli could not have been discovered as early as 1935 itself. He passed away in 1970. However The Neyveli Lignite Corporation has never failed to remember him with gratitude. AAs a mark of recognition and respect, a road in Neyveli Township has been named after Jambulinga Mudaliyar Road.





Shri JJambulingaa Mudaliarr – The maan behind the power

There is also another version of the chance of discovery of lignite. This is stated by Shri. C.D.Parthasarathy, a journalist in his book "Lignite in South Arcot". According to him one Srinivasa Iyer, a lawyer, found some chocolate brown stuff thrown out while a well was being dug in his lands at Karuvetti village in Chidambaram taluk, near Neyveli. When lighted, this stuff continued to burn. The officials of the Industries Department under whose supervision the digging of the bore well was carried out and sent the samples for examination. The Chemical Examiner, Government of Madras, confirmed that the sample fuel resembled coal in some degree. In the wake of this finding, a series of boring operations were made in the area.

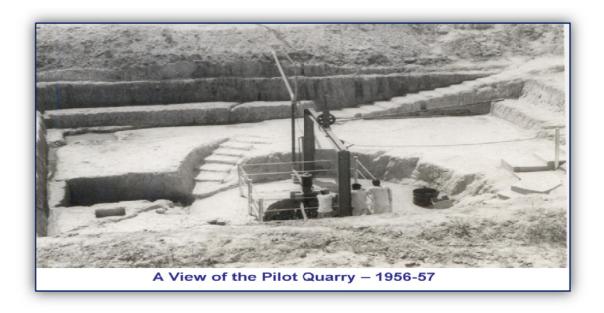
The Geological Survey of India conducted its drilling operation near Neyveli during the period from 1941 to 1946. Preliminary investigation indicated to spade work for the existence of about 500 million tonnes of lignite in that area. It was then Shri.H.K.Ghose, a mining Engineer and geologist was deputed by the Government of India to Neyveli to do the spade work for the project in July 1947. He is considered as the pioneer of the project. He bravely faced many hazards and challenges in the initial years of the project. But for his spirited spade work and resourcefulness, the project could not be seen the light of the day. In 1948, the first borewell sunk by Shri.Ghose had to be abandoned because of water logging and sand beds. The next borewell revealed samples of lignite. Next year Shri. Ghose drew an experimental open-out plan and called for tenders to commence excavations. In 1951 as many as 175 borewells were sunk in a cluster punctuating the chosen area. Shri Ghose proved the existence of about 2000 million tonnes of lignite reserves in the area.

During the early days of the project very few people in the surrounding areas were aware of the pioneering work carried out at the project site by Shri Ghose. He was put up in a building which served as his residence-cum office. His designation was office-in-charge of the Lignite Investigation. The project was named Government Lignite Mines, Neyveli. It is admitted by many people that if Shri Ghose had packed and gone, the further story of the Neyveli Lignite would not have progressed at all. It was the tenacity with which Shri. Ghose pursued his

efforts that made lignite investigations a success. His dedication to the discovery of lignite was exemplary. Localities therefore honored Shri Ghose by calling him 'Lignite Ghose'.<sup>16</sup>

At that time when Tamilnadu was facing an acute power shortage and it was hampering the industrial progress. In summer the hydro power stations were not able to meet the demands for power. Coal was not available in Tamilnadu. But it was found in plenty in North India. The cost of coal was high. Tamilnadu was very much on the lookout for an alternative source of fuel for generating power. When there were firm indications that lignite was available in abundance in the Neyveli belt the Government of Madras interest in tapping the lignite trapped there.

Both the Government of India and the Government of Madras started their combined efforts to explore lignite. Shri. Ghose was carrying on investigations at Neyveli. The Industries and commerce Department of the Government of Madras also had over 150 sinking borewells south of Viruthachalam in 1951. Mr.Paul Eyrich, a mining engineer from USA, was deputed by the Bureau of Mines, assisted the Government of Madras in deciding on the engineering and economic aspects of lignite mining in Neyveli. Based on his recommendations, the U.S. Government sponsored a study on the subject under the direction of V.P Parry. In 1952 the High Power Committee for Lignite Mining recommended the Pilot Quarry project. The Pilot Quarry was dug in 1953. The Pilot Quarry was commissioned by Dr.U.Krishna Rao, Minister for Industries, Government of Madras. A deep well dug in the quarry yield lignite. This led to the formulation of the Lignite Project.<sup>17</sup>

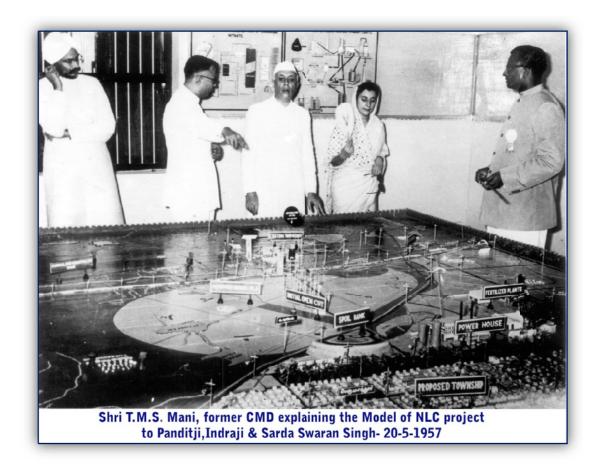


Pandit Nehru visited Neyveli for the first time in 1954. He was taken to the Pilot Quarry there by Shri.Kamaraj, then Chief Minister and Shri. R.Venkataraman and Shri.C.Subramaniam the then Minister of the Government of Madras. They impressed on Nehru that developing Neyveli would help the growth of Madras State and the neighboring States. Nehru realized the importance of the project and with this the industrial prosperity of the area was set on rolling.<sup>18</sup>

Though the Government of Madras decided in favour of exploiting lignite to meet the critical power shortage in the State, no concrete steps were taken for mining any specific quantity of lignite and for its purposeful utilization. In the meanwhile the Government of India appointed a three member committee. It consisted of Shri.C.V.Narasimhan I.C.S., Shri.A.C.Guha and Shri.A.Lahiri. This Committee inspected the Pilot Quarry and submitted a report to the Government.

The Government of India thereupon decided to avail under the Colombo Plan, the services of Powell Dufflyn Technical Services Ltd., Consulting Engineers in the U.K. to prepare a detailed project report on the mining, processing and the utilization of this mineral. The firm presented a comprehensive report in November 1954 containing a number of proposals. One of the proposals appeared to be economical and of manageable proportions. The firm recommended the continuation of the investigation and the dependable system of ground water borewell. The experiments and analysis of the samples conducted in

various laboratories abroad confirmed the quality of the Lignite. The quality of the Lignite was found to be better than the German Brown Coal. The artesian water which was hampering the progress of mining was pumped out by means of bore wells.



The estimated cost of the project was Rs.69 crores. The project was included in the Second Five year plan. (1956-1961) A provision of amount Rs.52 crores was made for this project during the plan period. The Government of India during the third quarter of the year 1956, the mining scheme which was estimated to cost Rs.17 crores, was placed for the special mining equipments for removing the overburden that occurred during the mining process.<sup>20</sup>

In the beginning, the Government of Madras constructed Quarters on lignite bearing areas for those who were engaged on the investigations. It was considered undesirable to construct the pucca quarters on such lands as they would be required for mining in due course necessitating demolition of the buildings constructed on them. Plans were therefore drawn up for acquisition of lands

outside the lignite bearing areas for a regular township to accommodate personnel who would be engaged on the construction of the project and in its operations. The Government of Madras was naturally seized with the problem of acquisition of lands for mining lignite and various schemes of the project. The acquisition of lands necessitated payment of compensation and rehabilitation of those who might be dispossessed of their lands and properties.<sup>21</sup>

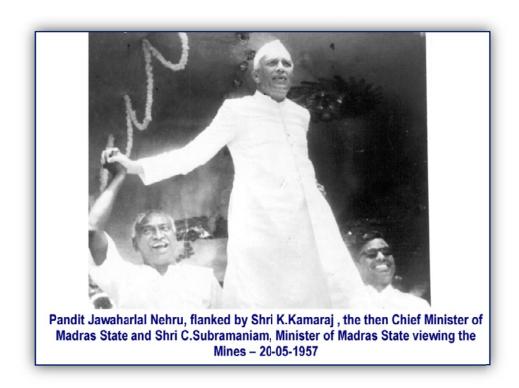
As the sanction for the acquisition of land was delayed and the arrival of some special mining equipment was also delayed. It was decided to commence the earth moving operations in the month of May 1957. The construction work of the machinery station and minor repair shops were undertaken and completed. This was the first mining block of lignite marked for exploitation in the northern part of the field and mining operations (Mine-I) commenced in 1957. The important task of recruitment of the staff needed for the initial stages of the mining scheme was also completed in time. The recruited staffs were trainees by the experts of the firms who were supplying conventional earth moving equipments.<sup>22</sup>

A lay out plan was prepared showing the township area, the mining area and several other production units. Action was also initiated for laying the railway siding. A comprehensive plan was worked out for the smooth and speedy implementation of the project.

Though Power was State subject, the Government of Madras decided to leave the project to the care of the Central Government because of the magnitude of the financial outlay required for exploitation of the fuel. The Government of India accordingly took over the financial control of the entire project from 1 st January 1955 until then all the investigation had been conducted at the cost of the State Government. With the concurrence of the Government of Madras the Central Government took over the administrative control from the 15 September 1955. That led to the formation of the Neyveli Lignite Corporation as a Government sponsored commercial concern. Thiru T.M.S. Mani I.C.S., the then Secretary of the Department of Industries, Labour and Co-operation who was till then working as part time Chief Executive officer of the Lignite Investigations, became the full time Chief Executive of the Project under the jurisdiction of the Government of

India.<sup>23</sup> Being an able administrator and a great visionary, he inspired the workforce with a new enthusiasm to meet the challenges and make progress. Under his leadership things started moving fast.

On the 14<sup>th</sup> November 1956, which incidentally happened to be the birthday of Pandit Nehru the Neyveli Lignite Corporation Ltd. was incorporated as a Private Limited Company under the Companies Act of the Government of India with the main object of taking over, implementing and managing the Integrated Neyveli Project. The Project included the mining of 3.5 MT of lignite, the setting up of 250 MW Thermal Power Station and the manufacture of nitrogenous fertilizers and carbonized lignite briquettes. It was considered that this project would help considerably in conserving coal especially metallurgical coal for more important purposes. The project also held out great promise for many new industries in the south which could not be started till then because of the high cost of coal. It went to public in the year 1959 with all the rights and liabilities of the Goyt, of India.



# **Formation of the Corporation**

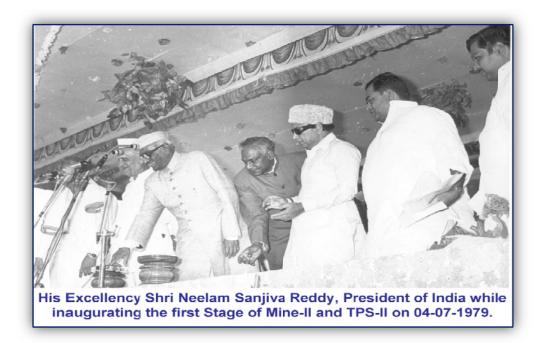


Seven Directors were appointed initially by the President of India in December 1956 and the remaining three Directors were appointed in April 1957. Mining operations began with conventional mining equipments. Earth moving operations with Safety of machinery equipments commenced from August 1959. Civil works for the first thermal power station and the commencement of civil works in fertilizer factory started in the same year.<sup>24</sup>



Exposure of first stretch of lignite seam on 24th August, completion and commissioning of clay washing plant by K.C. Reddy, the then Union Minister of Commerce & Industry on 30th December 1961, commencement of civil works in the Briquetting and Carbonisation plant, the first 50MW Thermal Power Station which was inaugurated by Shri Sarvapalli Radhakrishnan, the then President of India on 5<sup>th</sup> August 1962 were some of the remarkable events of the year of 1957 of 1966. The new building for Center for Applied Research & Development (CARD) and Circulating Water System (CWS) was completed. The 100 bedded General Hospital including X-Ray Plant was opened by Shri Kamaraj, the then Hon'ble Chief Minister of Madras in April.<sup>25</sup> Lignite Mining was commenced in May. The 250 MW Power Station with Russian collaboration was completed in August, 1964. The then Chief Minister of Madras shri M.Bhaktavatchalam inaugurated the agricultural project and the stadium on 24th January, 1965. Trial production of LECO<sup>26</sup> commenced at the Briquetting and Carbonization plant in August, 1965. Urea production started in the fertilizer factory. A full-fledge material management control wing was formed with effect from July, 1965.

#### The Formative Years 1967-1977



The seventies saw the retrieval of the company from the red, wiping out cumulative losses of the past and ushering in substantial profits. This decade also saw the evolution of NLC from mining to power generation. Lignite production was also stepped up with the second Thermal Power station being inaugurated by the then President of India Shri Neelam Sanjeeva Reddy. Social welfare prompted NLC to build houses on an experimental basis using the 'fly ash' derived from burning lignite.<sup>27</sup> Growth towards a Super Thermal Power Station based on Mine II was actively pursued with the World Bank, whose team visited NLC. Afforestation activity was developed to a large extent by cultivating 3426 hectare of land in the reclaimed area. Thus the child NLC grew up to meet the challenges of tomorrow.

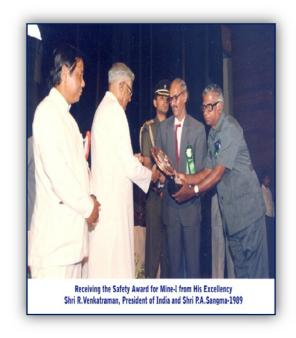


The last unit of Thermal Power Station-I (100 MW) was commissioned commercially on 15<sup>th</sup> September 1970. The capacity of the station reached 600 MW. A feasibility report for second mine cut with a capacity of 7 million tonnes of lignite and second thermal power station with a capacity of 1000 MW was prepared and after approval of the Board of Directors was sent to Govt. of India for consideration in 1972. Detailed Project Report for increasing the production in the Mine from 3.5 to 6.5 Million tonnes approved by the Govt. of India in 1973. An approximate area of 184.50 acres was cultivated after reclamation on 1975.

The Belt Reconditioning Plant with an annual capacity of 7000 m was put on trial operation in January 1977. First mine expansion begun with the commissioning of the new machinery. Second mine and second thermal power station receives Government approval in 1977 to 1978. Shri S.Yegeswaran, the then Chairman & Managing Director commissioning the new equipment under the Second Thermal Power Station (630 MW) and Second Mine cut (4.7 MTPA) inaugurated by Shri Neelam Sanjeev Reddy, His Excellency, the then President of India on 4<sup>th</sup> July, 1977.<sup>28</sup>

#### **The Productive era (1980 – 1990)**

The Department of public Enterprises, Government of India presented NLC with the 'Excellence in Performance' award for its performance in 1986 – 87 under mining and power sector. NLC made significant contributions to the state power grid by sanctioning the expansion of the second thermal power station's capacity from 630 MW TO 1470 MW and the output of the second mine from 4.7 to 10.5 million tonnes per annum. The company also earned many awards and a coveted status among government enterprises, setting new records in capacity utilization in the mines and power plants, upholding safety norms, fostering social welfare and netting huge profits.<sup>29</sup> This period was a landmark in the history of NLC and a harbinger of the glorious success, in the times to come.





Shri Sadiq Ali, the then Governor of Tamil Nadu inaugurated the Intensive Care Unit of the General Hospital of NLC in 1980. The sanctioned amount received by the govt. for expansion of second mine and the second thermal power station in 1983 with the inauguration by Shri P.Shiv Shankar, the hon'ble minister for Energy on 30<sup>th</sup> September 1984.

The maiden 210 MW unit of the 630 MW in second thermal power station was commissioned by Shri Vasanth Sathe, Hon'ble Union Minister for Energy and he issued the Public Neveli Bond, 'A' series in 1986. The 230 KV line to Pondicherry and 400 KV line to Madras was commissioned. With this, NLC launched its first transmission programme with the dedication of second thermal power station to the nation and the formal commissioning of the second unit of stage-I, by Shri Rajiv Gandhi, the then Prime Minister of India who issued the Public issue of Neyveli Bonds, 'B'series on 27th March, 1987. A contract was concluded with the supply of power from second Thermal Power Station to other states and Pondicherry. The Synchronization of Unit No.1 of Thermal Power Station –II was done 10 weeks ahead of approved revised schedule on 17th January, 1988 and the second thermal power station reached its full generation on 2nd February, 1988.



#### The Vibrant Phase 1991 -2000

This phase was marked by rapid growth and success. NLC had achieved many honours and awards for its corporate excellence. During 1992 – 1998, all the power generating units of Thermal Power Station – I underwent Life Extension Programme and got a new lease of life. 1993 – 1994 marked the transfer of power to the national grid after a bill for power transmission was approved by parliament in1992. Emergencies could happen anywhere and at anytime but the ability to react to the situation was NLC's forte. Flooding of mines due to heavy rains in 1996 was managed effectively with prompt relief work. The year 1998-1999 was an exceptional year because the incidence of fatal accident was zero, for the first time since inception. Thus this decade was filled with achievements for NLC to be proud of. This was also a phase to usher in the better and reach new heights.





Asia's first Bridge-type Bucket Wheel Excavator (3300 tonnes) for mining lignite was commissioned by Shri M.M. Rajendran, the then Chief Secretary, Govt of TamilNadu in 1990. The Proposal for setting up pithead power station of 2 x 120 MW at Barsingsar, Rajasthan and MoU signed with Rajasthan State Electricity Board was directed by Project Investment Board.<sup>32</sup> The First Mine Expansion 6.5 MTPA to 10.5 MTPA and the Life Extension Programme of TPS-I were the projects sanctioned by GOI in the year 1991.

MoU signed between NLC and M/s. ST Power Systems (USA) on 31<sup>st</sup> August, 1992 for handing over the Zero Unit project to M/s. ST Power systems (USA). MoU signed between NLC and Power Grid Corporation of India in Nov 1992 and 400 KV Transmission Line Systems handed over in Dec 1992. Parliament approved the bill for transfer of the project for Power Transmission Lines to the Power Grid Corporation of India Ltd., with effect from 1<sup>st</sup> April 1992. Seventh unit of Thermal Power Station II dedicated to the nation by Shri Ajith Kumar Panja, the then Union Minister of Coal, and Government of India on 11<sup>th</sup> December 1994.

Laying of Foundation Stone for Thermal Power Station-I Expansion (2 x 210 MW) on 25<sup>th</sup> February 1996 by Shri Jagadish Tytler, the then Hon'ble Union Minister of State for Coal. Smt.Kanti Singh, the then Union Minister of State for

Coal dedicated the LEP units to the nation on 25<sup>th</sup> October 1996. Fuel supply agreement reached with M/s ST-CMS, for their 250 MW independent power project on 29<sup>th</sup> April 1998.<sup>33</sup>

The First Neyveli Book Fair was inaugurated on 3<sup>rd</sup> September 1999. A Statue of Jambulinga Mudaliar, the founder of lignite was unveiled at the Golden Jubilee Park at Mine II entrance by Dr. Rajani Rai, the then Lt. Governor of Pondicherry on 11<sup>th</sup> September 1998.

### Reaching new heights (2001 -2010)

The 21st century saw NLC setting new precedents, emerging at the 56th position among India's top 500 companies for the year 2004 as ranked by Dun & Bradstreet. NLC carried out expansions in Mine I and Mine II and Thermal Power Station II and the SME strength was enhanced to handle the additional production. The state governments of Karnataka, Tamil Nadu and Kerala signed MoUs and Power Purchase Agreement with NLC to facilitate the supply of power from its Thermal Power Stations. During this decade, NLC's three Mines and Thermal Power Station achieved ISO certifications for Quality Management System, Environment Management System and Safety Management System. 34 NLC has carried out a massive afforestation drive in mine spoil areas transforming the once arid lands into lush green terrain. NLC's giant strides in productivity, management, social welfare and environmental areas lie in the many awards that came its way. As the biggest open-cast mechanized lignite mines in India and South Asia's first and only lignite Thermal Power Station, NLC – a 'Mini Ratna' enterprise was poised to make that giant leap on to where challenges beckoned and the 50 year company was all set to blaze a new trail of success.



The first overburden system in Mine 1A was inaugurated by the then Chairman and Managing Director, Shri A.K.Sahay on 30<sup>th</sup> July 2001. An expression of interest with Chennai Petroleum Corporation Ltd. was shown to set up a joint venture of refinery residue based thermal power station (492 MW) at Chennai on 12<sup>th</sup> February 2002. A MoU with Government of Rajasthan was set up to 2.1 MT, 2 x 215 MW mine –cum-power project at Barsingsar on 10<sup>th</sup> June 2002. Unit I of Thermal Power Station-I Expansion dedicated to the nation by Sushree Uma Bharati, then Union Minister of Coal, Govt. of India on 18<sup>th</sup> December 2002.<sup>35</sup>



Lignite conveyor system of Mine IA was commissioned on 30<sup>th</sup> March 2003. Mine IA project was commissioned on 1<sup>st</sup> April 2003. A MoU was signed with Tamil Nadu Electricity Board and a joint venture of 1000 MW coal-based thermal station was set up at Tuticorin on 19<sup>th</sup> June 2003. TPS-I Unit-II expansion was synchronized on 10<sup>th</sup> August 2003 by Shri P.K. Mishra, then Secretary to Ministry of Coal, Govt. of India. NLC was ranked 56<sup>th</sup> among India's top-500 companies,<sup>36</sup> evaluation based on income, net profit and net worth. NLC was ranked one among the top 2000 companies in the world by Forbes magazine, evaluation based on composite sales, profits, assets and market value.

'Mini Ratna' status was conferred by Govt. of India on 30<sup>th</sup> August 2004.<sup>37</sup> NLC's three Thermal Power Stations achieved ISO:9001:2000 (Quality Management System) and ISO:14001:1996 (Environmental Management System) certificates, 30<sup>th</sup> August 2004. NLC's three mines achieved ISO 9001:2000(Quality Management System) on 11<sup>th</sup> August 2005.<sup>38</sup> A MoU was signed with ONGC on the development of underground lignite gasification on 24<sup>th</sup> September, 2005. A joint venture of NLC Tamil Nadu Power Ltd. with Tamil Nadu Electricity Board was incorporated to execute the Tuticorin Power Project 18<sup>th</sup> November 2005.





NLC's three mines achieved ISO 14001:2004 (Environmental Management System) on 9<sup>th</sup> January 2006 and OHSAS 18001:1999 (Safety Management System) on 13<sup>th</sup> January 2006. Hon'ble Prime Minister of India, Dr.Manmohan Singh inaugurated the Golden jubilee celebrations and laid the foundation stones for Mine II and Thermal Power Station II Expansion Projects on 4<sup>th</sup> February 2006. Hon'ble Union Minister for Coal, Shri shibu soren, Hon'ble Union Minister of State for Coal, Dr. Dasari Narayana Rao, Hon'ble Union Minister for Youth Affairs, Sports & Panchayat Raj, Shri Mani Shankar Aiyer, Hon'ble Union Minister for Environment & Forests, Shri A.Raja, Hon'ble Union Minister for Health & Family Welfare, Dr. Anbumani Ramadoss, Hon'ble Union Minister of State for Programme Implementation & Statistics (Independent Charge), Shri G.K. Vasan, Han'ble Union Minister of State for Railways, Shri R. Velu, Hon'ble Union Minister of State for Finance Shri S.S Palani Manikam, Hon'ble Union Minister of State for Home Affairs, Shri S. Ragupathy, Hon'ble Union Minister of State for Law & Justice, Shri K. Venkatapathy, Shri E.Ponnuswamy, M.P., Shri M.R.K. Panneerselvam, M.L.A., Shri H.C.Gupta, Secretary, Ministry of Coal, Govt. of India also participated in the Golden Jubilee inaugural function.

An agreement was signed on 13<sup>th</sup> March 2006 with United States Trade and Development Agency (USTDA) for granting financial aid in developing

alternative mining technology. An agreement for foreign Currency loan for Euro 50 million to meet the capital expenditure was signed with the Singapore branch of Calyon Bank on 2<sup>nd</sup> March 2006. Mining Operations were inaugurated at Barsingsar Lignite Mine on 7<sup>th</sup> August 2006. The Government of India granted Patent for process of the production of Humi Gold (A salt of Humic Acid extracting from Lignite) on 1<sup>st</sup> August 2006 which is the first patent obtained by NLC.<sup>39</sup>

Integrated Lignite Resource Information System (ILRIS) a Database Centre on Lignite resources was inaugurated at Neyveli on 17<sup>th</sup> February 2007. NLC's Research and Development unit successfully produced Activated Carbon from Lignite and the pilot plant for the process that was commissioned on 5<sup>th</sup> June 2007. Crisis Counselling Centre for prevention of suicides was inaugurated at Neyveli on 12<sup>th</sup> August 2007. "Lignite Sakthi Nagar" the township for Barsingsar Project was inaugurated by Dr. Dasari Narayanan Rao, the then Hon'ble union Minister of State for Coal on 18<sup>th</sup> October 2007. NLC signed an MoU with the Indian Chapter of Transparency International (TII),<sup>40</sup> an international non-profit organization with the objective to curb the corruptions on 29<sup>th</sup> December 2007 for implementing Integrity Pact Programs in NLC to achieve highest ethical standards in business.

NLC signed an MoU with the National Research Development Corporation (NRDC) on commercialization of humic acid on 23<sup>rd</sup> April 2008. Lok Adalat for settling the land acquisition cases through enhanced compensation was inaugurated by Hon'ble Justice of Madras High Court, Shri A. Kulasekaran on 22<sup>nd</sup> March 2008. Mining Equipment Maintenance Management System (MEMMS) was inaugurated by Shri. K.S.Anandan, the then Director Mines on 9<sup>th</sup> April 2008. Telemedicine Facility, a part of integrated hospital Management System was inaugurated by Shri. S.Jayaraman, the then Chairman and Managing Director on 27<sup>th</sup> May 2008.



Smt. Sonia Gandhi, Hon'ble Chairperson of United Progressive Alliance, inaugurated the NLC Lignite mine at Barsingsar, Rajasthan. The Hon'ble Union Minister of External Affairs and Finance, A Bhoomi Puja was performed for the coal handling system works projects in the site office and interim power supply arrangement (110KW, LT supply) was inaugurated by Shri Pranab Mukherjee at NTPL project, Thoothukudi on 10<sup>th</sup> and 11<sup>th</sup> September 2009. A 700 Lts Bucket Wheel Excavator designed and erected by M/S Thyssen Krupp Industries India Ltd. was inaugurated by CMD, NLC at Mine-I Erection yard on 1st April 2009. A Tripper Car designed and erected by M/S Thyssen Krupp Industries India Ltd. was commissioned by CMD, NLC on 22<sup>nd</sup> April 2009. Another 700 Lts Bucket Wheel Excavator designed and erected by L&T for Mine-II was inaugurated by CMD, NLC on 1<sup>st</sup> April 2009. Also the lignite handling system of TPS-II Expansion was inaugurated CMD, NLC on 21st July 2009. Site Mixed Emulsion Plant was commissioned at Mine-II by CMD, NLC on 26<sup>th</sup> July 2009. The Generator Slators of the unit-II of the 2x250 MW was positioned in TPS-II Expansion on 28<sup>th</sup> October 2009. An MoU with NIT, Trichy was signed for carrying out Research and Development on making the storm water control pumps and pipes deployed in the Mines of NLC in to rustproof on 3<sup>rd</sup> December 2009. 41

Shri Sripraksh Jaiswal, Hon'ble Union Minister of State for Coal, Statistics and programme Implementation dedicated Mine-II expansion project to the Nation and inaugurated Storm water line (Mine-II to TPS-II Expansion) on 5<sup>th</sup> April 2010 at Neyveli. He also dedicated unit I of the Barsingsar plant, Rajasthan to the nation in the presence of Shri Ashok Gehlot, Honb'le Chief Minister of Rajasthan and synchronized the unit-II at project site Barsingsar on 5<sup>th</sup> June 2010. A MoU with Vellore Institute of Technology was signed for the R&D project. Utilization of bottom ash of Thermal Power station for construction activities was substituted for fine aggregate (Sand) on 3<sup>rd</sup> December 2010 at Neyveli. 42



#### The Navaratna Era

NLC has conferred with "Navaratna" status and Navaratna status Certificate was presented by Smt. Pratibha Devisingh Patil, Honb'le Former President of India at New Delhi, on 11<sup>th</sup> April 2011.<sup>43</sup> In the same year an Administrative office building for NTPL Coal Based Power Station was inaugurated by CMD, NLC. The first unit of the Neyveli TPS-I has completed its 50 years and during the span it has worked 3,19,907 hours and generated 14,302

Million Units. NLC and UPRVUNL entered in to an MoU to set up a joint venture for a 1980 MW Coal based Super Critical TPS at Ghathampur, Uttar Pradesh. It was signed between Shri. B.Surender Mohan, the CMD of NLC and Shri. Dheeraj Sahu, the Managing Director of UPRVUNL at Lucknow on 6<sup>th</sup> October 2012. In November 2012 both NLC and UPRVUNL jointly incorporated a new company named Neyveli Uttarpradesh Power Ltd. (NUPPL) and contributed an equity ratio of 51:49 respectively.



UPRVUNL jointly incorporated a new company named NUPPL

The NTPL Township was inaugurated by Shri. B.Surender Mohan, the CMD, NLC at Harbour Estate in Thoothukudi in September 2013. A Fuel supply agreement with Mahanadhi Coal Fields Ltd. was entered by NTPL on September 2013. A site office for the NUPPL project was inaugurated by Shri Sripraksh Jaiwal, the Honb'le Minister of Coal at Lahuriman kasimpur village of Kanpur District on February 2014. An MoU was jointly signed by NLC and IIT Madras (IITM) Chennai for a research project to develop a suitable method to detect the buried objects by Ground Penetrating Radar (GPR) technique in March 2014. NLC chaired on Corporate Social Responsibility instituted at the Institute of Public Enterprise, (IPE) Hyderabad.

To reap the benefits of the renewable energy revolution, as part of the National Solar Mission, Govt. of India has set target to achieve 1,00,000 MW of Solar power by year 2022, now NLC has proudly ventured into the renewable energy sector by commissioning its maiden 10-MW capacity Solar Power Plant Project at Neyveli. Shri B.Surender Mohan CMD, NLC commissioned the Plant at Neyveli on 28-09-2015. The Solar Power Plant has been brought with an inverstment of estimated at Rs. 74.6 Crores and it has 48000 photovoltaic panels installed approximately in 54 acres and its projected Generation for First Year is 16.40 million units of energy. 45

NLC signed an MoU with M/S Kobe Steel Ltd., Japan and NIT, Trichy for R&D projects. Commercial Operation Declaration (COD) for Unit-II of TPS-II Expansion was attained on 21<sup>st</sup> April 2015. Department of Machine Design and Research (DMDR) of Wroclaw University of Technology, Poland were engaged as consultant to check the static calculation of structures. Two New Bucket wheel Excavators commissioned at Mine-II on 18<sup>th</sup> December 2015. Two Bucket Wheel Excavators of 700 Litre capacity was erected and supplied by M/S. Larsen & Toubro Ltd. Chennai, in collaboration with M/S. Sandvik Mining and Construction, Austria and M/s. UNEX, Czechoslovakia at a cost of Rs. 196 Crores including spares, tools, maintenance for one year warranty period and 3 Years after warranty period. 46

## **Awards and Accolades of NLC**

The true recognition of a company's merit is the awards and accolades accorded by the Government and other reputed institutions. At NLC, it is believed that the laurels they win reflect the sincere efforts of the employees and the passion they bring to their work place every single day. Right from the inception, NLC has bagged a number of Prestigious Awards in the fields of productivity, safety, caring the environment, Industrial Relations, caring the community, Import substitutions, Fly ash utilization, specific fuel oil consumption and small savings and so on.





Corporate Vigilance Excellence Award 2016 National Golden Peacock Award 2015

## **Environment Awards**<sup>47</sup>

- ➤ Special Award for excellence in Integrated Water Resources Management 2015 instituted by Central Board of Irrigation and Power.
- ➤ NLC's TPS-I Expansion won the Silver Shield of National Environment Management Award, instituted by Ministry of Power, Govt. of India (the highest award in this category), for the years 2012-2013 and 2010-2011 among Coal / Lignite base Thermal Power Stations.
- ➤ Green tech Environment Award-2013 (Gold category) instituted by Green tech Foundation, New Delhi.
- ➤ SCOPE-Meritorious Awards for Environmental Excellence and Sustainable Development (2011-2012 & 2005-2006)
- ➤ Indira Gandhi Paryavaran Puraskar award 2009 instituted by the Union Ministry of Environment and Forests.
- ➤ Indira Priyadarshini Vrikshamitra Award from Government of India 1986.
- FICCI Award for Environment Preservation and Pollution Control 1988.
- ➤ K.P. Goenka Memorial Award for Environmental Care 1988.
- Fly Ash Utilization Award from Council of Power Utility 1999.
- ➤ Indo-German Green Tech Environmental Excellence Award 2000-2001.
- Golden Peacock Eco Innovation Award 2008.

#### **CSR** awards

- > Special appreciation for the commendable performance in Swacch Bharat Abiyan and Swacch Vidhyalaya from Government of India.
- ➤ Golden Peacock CSR Award for 2015 in Mining and Metallurgy Sector, instituted by Institute of Directors, New Delhi.
- ➢ Greentech CSR Award 2015 (Platinum Category), 2014 (Gold Category)
   & 2013 (Silver Category) instituted by Greentech Foundation, New Delhi.
- ➤ BT-Star CSR Award 2015 instituted by Bureacracy Today, a leading journal.
- ➤ Corporate Citizenship Award (2013) and Award for the Best PSU in implementing CSR for the years 2015 & 2014 from Public Relations Society of India (PRSI) towards maintaining eco-friendly environment and for the upliftment of the community especially for the disabled and mentally challenged children.
- ➤ SCOPE Meritorious Awards for Corporate Social Responsibility and Responsiveness (2004-2005)
- ➤ CSR Award for the year 2005 from Help Age India.
- ➤ Business World-FICCI-SEDF Corporate Social Responsibility Award for the year 2006.
- ➤ Corporate Social Responsibility Award 2009-2010 from Govt. of Tamil Nadu in appreciation of NLC's yeoman service through Socio Economic Welfare Activities.
- ➤ IPE-CSR Corporate Governance Award instituted by the Institute of Public Enterprise.





**Leadership Excellence Award 2015** 

National Award For Outstanding
Industrial Relations 2015

## **Human Resource Awards**<sup>48</sup>

- The Organising Committee of the world HRD Congress presented 'Change Agent and Leadership Award' to NLC for the innovative strategies and approaches implemented by our HR Department and for maintaining harmonious industrial relations.
- ➤ National Award for Best HR practices instituted by 'Governance Now', a renowned e-magazine.
- ➤ 'National Award for Innovative Training Practices- 2009-2010', instituted by ISTD.
- ➤ Shramik Shiksha Award from Central Board of Workers Education, Ministry of Labour & Employment, Government of India for imparting education to workers.
- ➤ Director General of Employment and Training, Ministry of Labour & Employment, Government of India declared NLC as best establishment of the region for the year 2008-2009.
- ➤ Prestigious award for outstanding Industrial Relation for the year 2003-2004, from All India Organisation of Employers, an allied body of FICCI.

# Finance Awards<sup>49</sup>

- ➤ National Cost Management Award 2014 institute by the Institute of Cost Accounts of India.
- ➤ Cost Management Excellence Award 2012 from the Institute of Cost Accounts of India.
- > ICWAI National Award for excellence in Cost Management.



GREENTECH Environment Award 2015

LENTECH Sus bility & C

Scope Excellence Award -Gold Trophy 2016

Indo-German Green Tech
Environmental Excellence Award 2015

# Safety Awards<sup>50</sup>

- ➤ NLC's Thermal Power Station-II won Golden Peacock Occupational Health & Safety Award 2013, institute by the Institute of Directors.
- ➤ NLC's Thermal Power Station-II won the Green-Tech Gold Award 2013 and 2014 institute by Green-Tech Foundation for its best safety practices.
- ➤ Safety and Quality Award 2011, from the Institution of Engineers-India (IEI).
- ➤ The Tamil Nadu State Centre of St. John's Ambulance presented the prestigious 'Florence Nightingale Silver Trophy' to NLC General Hospital, on 27.10.2010.

➤ Indo-German Green Tech Safety Gold Award in Mining Sector & Thermal Power Sectors for the year 2002-2003.

#### **Public Relations Awards**

- ➤ PRSI Award for Best House Journal, Best E-Journal, Best Corporate Film, Best Brochure.
- > PRSI Award for Best PSU implementing RTI Act.

# Vigilance Awards<sup>51</sup>

➤ Corporate Vigilance Excellence Award instituted by the Institute of Public Enterprises for the year 2014-2015 and 2013-2014 .





Shri. Sarat Kumar Acharya, CMD, NLC at the award ceremony of NIPM
National Conference from NIPM's national president Shri. Somesh Das
Gupta







NLC is a role model to Mining **Industry** 

# Some of the Other Major Awards<sup>52</sup>

- ➤ India Power Award-2012 instituted by Council of Power Utilities for being the largest Lignite Power Generating Company.
- > NLC's Mine-I and Mine-II won the National Energy Conservation Award - 2014 & 2013 respectively (1st Prize in Mining Sector) instituted by Ministry of Power, Govt. of India.
- The Forum of Women in Public Sector (WIPS) functioning under the aegis of SCOPE presented the Best Enterprise Award for the years 2001, 2003, 2007, 2010, 2011, 2012, 2013, 2014, 2015.
- ➤ Master Brand Award from CMO Council.
- ➤ IEI Industry Excellence Award 2014 & 2013 instituted by Institution of Engineers (India).
- > IEI Journal Innovation Award instituted by Indian Mining Engineering Journal for using state-of-the art Mining Technology with effective CSR and Environment Management initiatives.
- > Special Award for diversification of Power Projects, instituted by Elets Technomedia Private Limited.

- ➤ Productivity Award instituted by World Academy of Productivity Science.
- ➤ Best Overall Performance (Brown Coal) 2013 award from the Council of Power Utilities.
- ➤ Performance Excellence Award 2012 (Organization Category) instituted by Indian Institution of Industrial Engineering (IIIE).
- ➤ Prestigious "Coal India Trophy" for the successful implementation of its Mine-IA project without time and cost over-run for the year 2003-2004.
- Navratna Status presented by Smt. Pratiba Devisingh Patil, Her Excellency, the President of India to NLC at Vigyan Bhavan, New Delhi on 2011.





**Best Industrial Relations Award to NLC** 

Corporate Citizenship Award by Publi Relations Society of India (PRSI) -December 2013





FICCI Award for Environment Preservati

Best Overall Performance (Brown Coal) Award 2013

and Pollution Control by Council of Power Utilities

This in depth study of the historical success of Neyveli Lignite Corporation which runs like a story is about the mega growth of Neyveli Lignite Corporation encapsulated with power production, industrial development, and economic advancement, thus enabling Tamilnadu to figure in the industrial map of India. The period of study of the Industrial growth from 1956 – 2016 is actually the most crucial period in the growth of Neyveli Lignite Corporation where in after the entire struggle, trials and tribulations is marched successfully into the glorious phase of its development. During this period the mining and utilization of lignite had been going on with varying degrees of ups and downs and obstacles both technologically and financially.

The NLC has played a major role in the development of Neyveli city and its township. It shines as a model township and it is self sufficient and has taken interest to promote the welfare of the people of the surrounding villages and areas.

#### **CHAPTER - II**

#### THE ORIGIN AND GROWTH OF NEYVELI LIGNITE CORPORATION

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